

# Ecological engineering and management practices can enhance the value of strongly human influenced navigable waterways in the EU Green Infrastructure



EU Target(s): 2

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## Introduction

In Flandres (northern part of Belgium) navigable waterways (canalised rivers or artificially created canals) are mostly strongly human influenced. To facilitate navigation hydromorphological alternation are undertaken including deepening, straightening, widening, damming, dredging, water regulation and artificial shoreline embankments. In addition, moving vessels generate physical waves and currents which increase bank and bed erosion, sediment suspension, turbidity and cause water level fluctuations. As a result, severe impacts on biodiversity of navigable waterways occur originating from habitat losses, fragmentation and physical forces. Through integrated water management, a harmony between the different functions of the waterway is to be found.

## Ecological engineering and management

Ecological values of navigable waterways can be enhanced by ecological engineering (Figure 1 & 2) or by management measures (Figure 3).

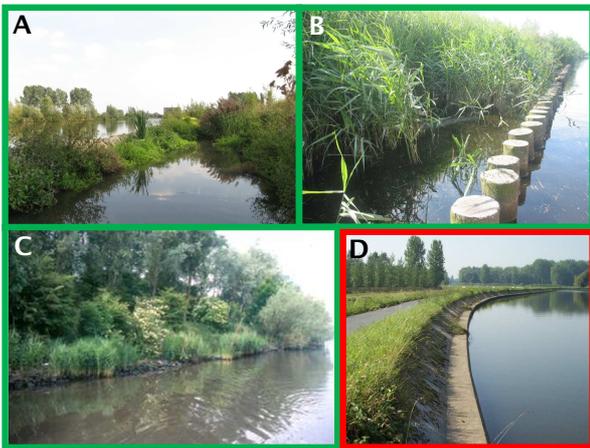


Figure 1. A, B, C: ecologically friendly bank stabilisations favour riparian biodiversity and can mitigate navigation effects; A & B: shallow water zone constructed by riprap (A; Canal Ghent-Bruges) or by wooden palisades (B; Yser); C: gentle profile with coarse riprap (Scheldt; picture Ann De Rycke); D: concrete bank revetment (Dender) with minor ecological value (picture Sophie Vermeersch).



Figure 2. Measures promoting longitudinal and lateral free migration of aquatic species are key elements for the ecological improvement of waterways. The pictures show a semi-nature-like fish bypass at Asper (Scheldt; pictures David Buysse).



Figure 3. Ecological management measures for waterway embankments aim to augment vegetation structure and biodiversity. A & B: embankments with important ecological values by extensive grazing (A: Canal Ghent-Bruges) or mowing (B: Canal Ghent-Bruges); C: embankment without any management regime and dominated by *Urtica dioica* (Drainage-canal of the Lys).

## Contribution of the work to the implementation of the target

By appropriate planning, engineering and management, navigable waterways can function in and can be incorporated in the EU Green Infrastructure. In this way, ecosystem services of navigable waterways are maintained and enhanced. These services include habitat provision, water purification, bank stabilisation, pest control, pollination together with cultural and recreational services.